AVIRIS Instrument Computer Changes in Hardware and Software for Data Acquisition

"Too clever is dumb" – German Proverb

Spectrometer (x4)

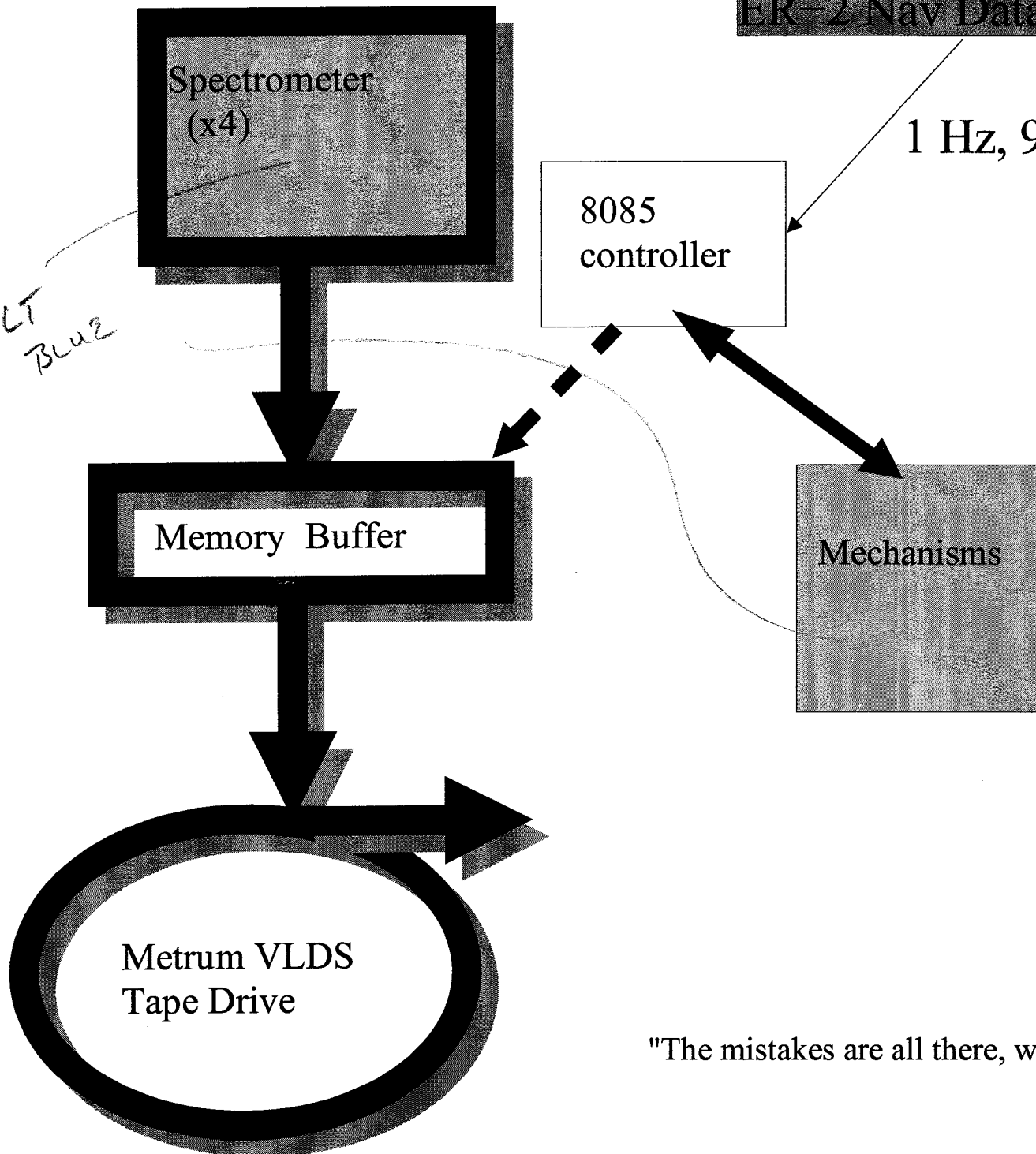ER-2 Nav Data, 1Hz

1988−98

1 Hz, 9600 Baud Serial

8085 controller

LT BLUE

Memory Buffer

Mechanisms

Metrum VLDS Tape Drive

"The mistakes are all there, waiting to be made" − Tartakower

Spectrometer (x4)

LT BLUE

8085 controller

Memory Buffer

Mechanisms

LT BLUE

Metrum VLDS Tape Drive
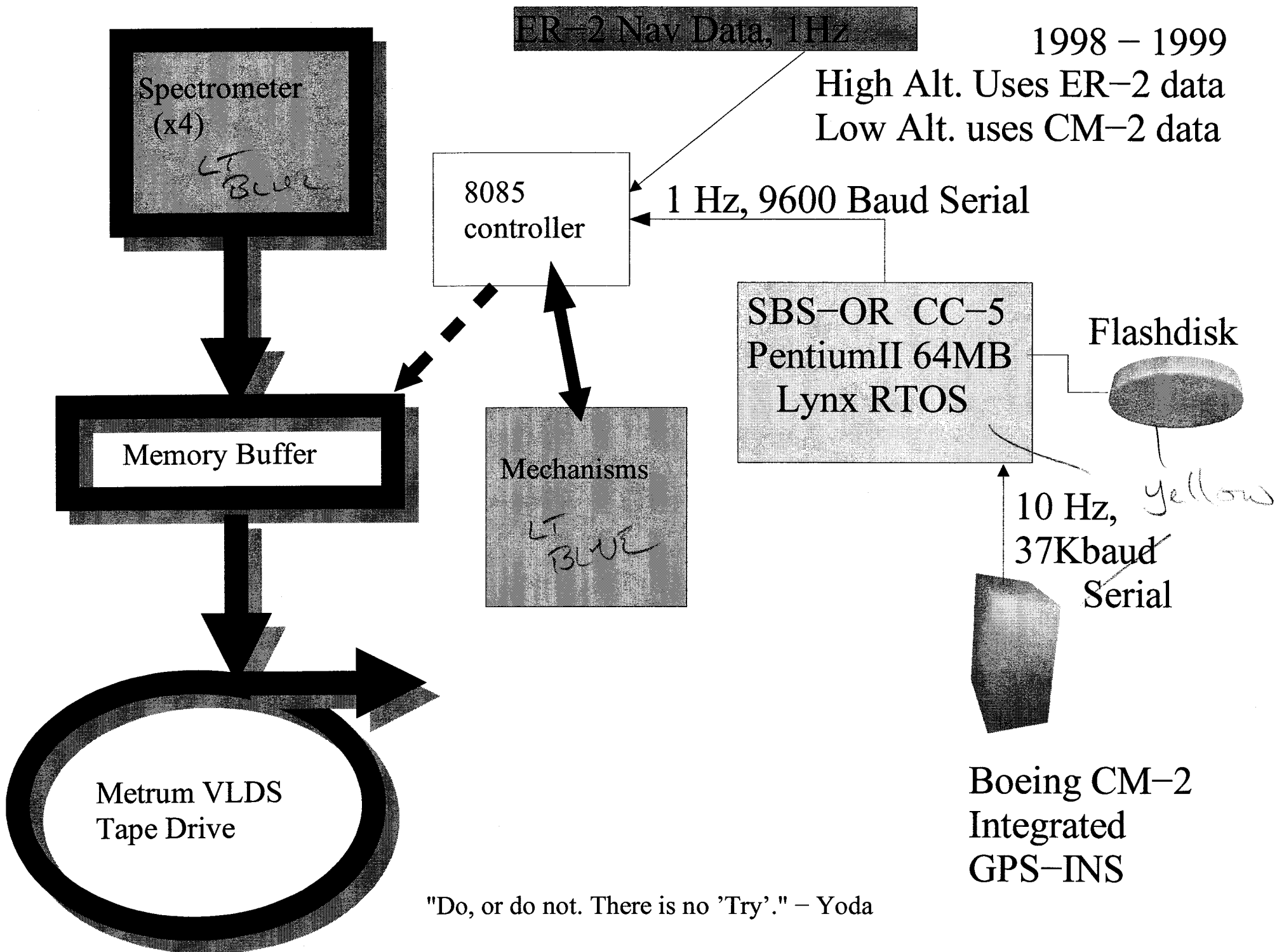
1998 − 1999
High Alt. Uses ER−2 data
Low Alt. uses CM−2 data

1 Hz, 9600 Baud Serial

SBS−OR CC−5
PentiumII 64MB
Lynx RTOS

Flashdisk

Yellow

10 Hz, 37Kbaud Serial

Boeing CM−2 Integrated GPS−INS

"Do, or do not. There is no 'Try'." − Yoda

Spectrometer (x4)
LT Blue

2001
In Progress

Time Sync +/- 1 microsecond

Fiber Optic Xmit Board (x4)

Flashdisk

Fiber Optic Recv Board

Boeing CM-2
Integrated
GPS-INS

Bittware Dual
Sharc 21060
DSP Board

Alphi
Intelligent
IO
Controller

SBS-OR CC-7
Celeron CPCI
256 MB
Lynx RTOS

Serial IO

yellow

Metrum DLT
SCSI Tape Drive

Mechanisms
LT Blue

Racal Differential
GPS

" Well done is better than well said" – Benjamin Franklin
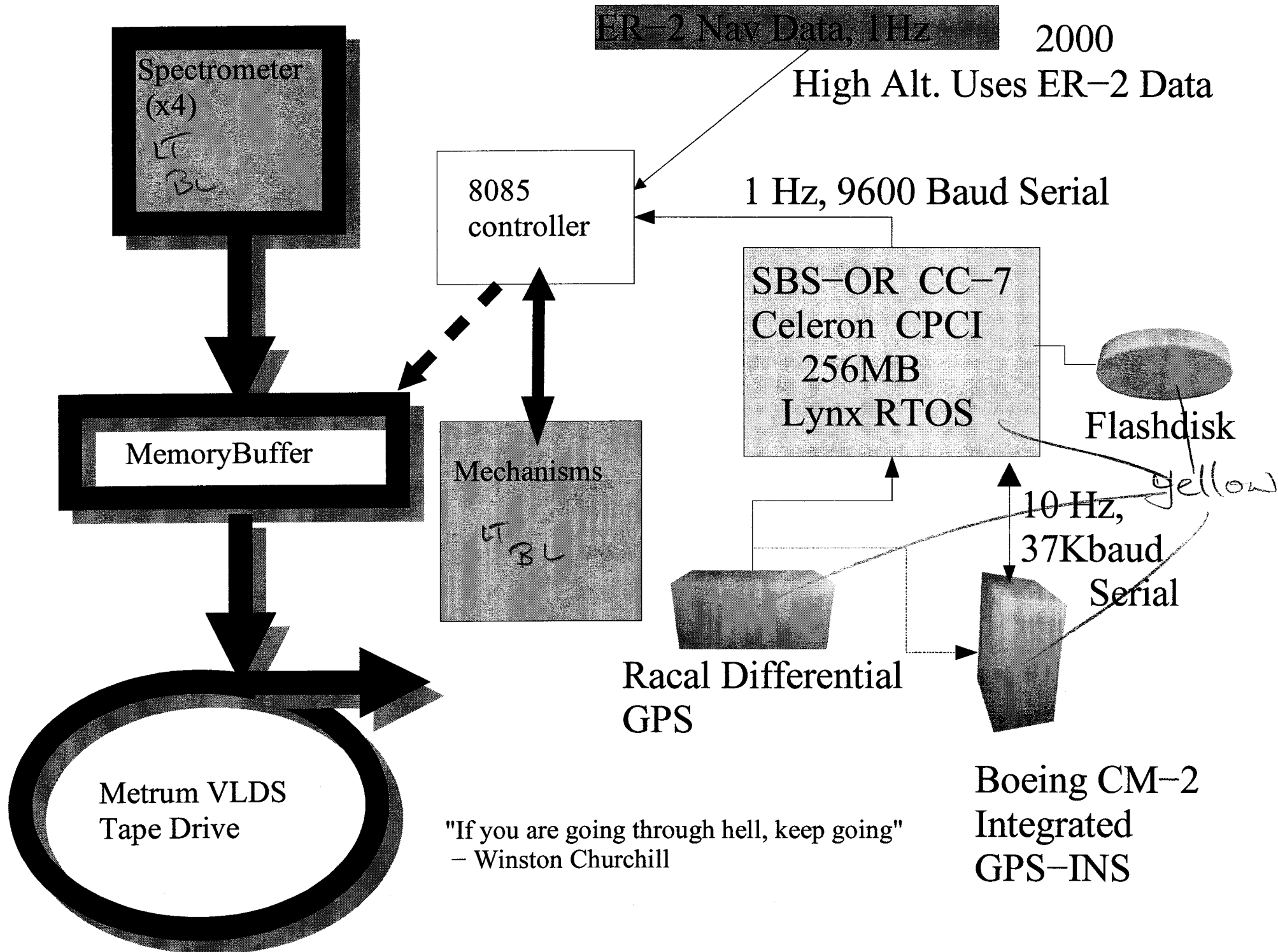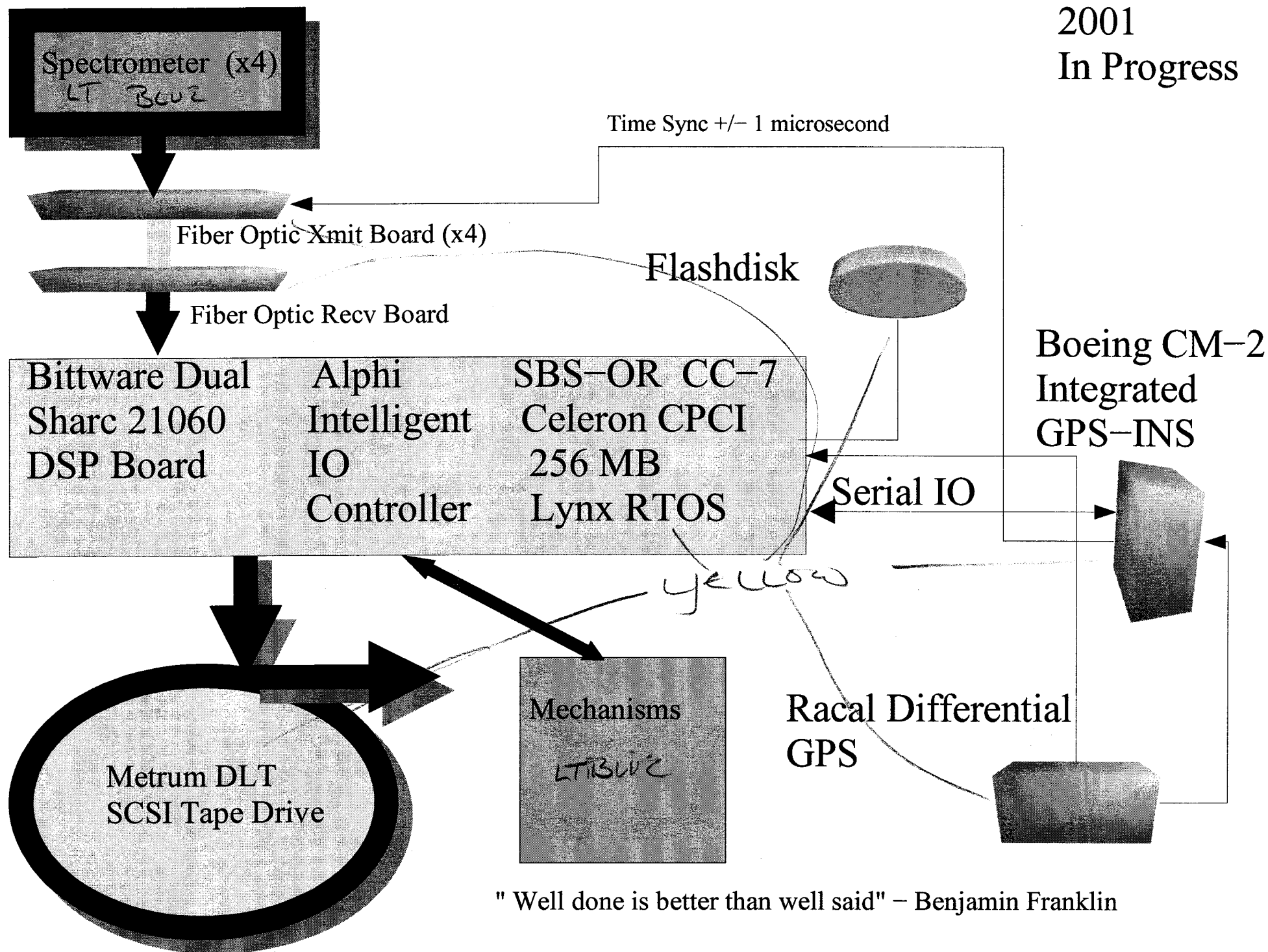
Points to Ponder

- You need an RTOS to implement a complex Real Time System.

- Don't write Assembly language unless you MUST. Be able to say "Let's change Hardware". A good RTOS lets you write portable code.

- The difference between Hardware and Software:
  - Hardware is what breaks when you #%*! with it long enough, Software is what works when you #%*! with it long enough.

Sources

- Operating Software − lynuxworks.com, Lynx RTOS

  - Excellent Support at a reasonable price. POSIX standard.

- DSP − bittware.com, dual Analog Devices "SHARC"

  - Outstanding support and assistance, "works as advertised"

  - New "Hammerhead" board offers 2.4 Gflops.

- Integrated GPS/INS − systron.com (was Boeing)"CM−2"

  - Outstanding reliability "A brick that knows where it is"

  - Systron bought the Migits product from Boeing in December

- CPCI Computer − sbs.com SBS/OR "CC−7"

  - Excellent Support and reliability.

- Digital IO − alphitech.com Intelligent Digital IO board

  - On board TMS320 to handle mechanisms control

Additional Information

- The CM−2 gps/inertial nav system is still available but going fast at about $22k/each. There is a CM−3 with 12 channel GPS coming.

- Initializing a CM−2 can be annoyingly difficult if you only know what is in the manual. I will make myself available for off−line discussions for anyone interested in how to make it work.

- Using a DSP for IO is the closest thing to magic that you can use. This programming can also be explained IFF you are interested.